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13. ABSTRACT (Maximum 200 words)

During the past year, we have worked on several research projects in the areas of reliability, stochastic systems, environmental models, life and social sciences, among others. In structuring the various statistical models in these areas, our aim was to clearly identify the problem under investigation, formulate the problem in such a manner so as to be mathematically complete, illustrate the usefulness of our findings with real data when available or depend on numerical simulation and interpret the final results.

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RESEARCH ACCOMPLISHMENTS

UNDER CONTRACT   AFOSR-80-0164

by

Chris P. Tsokos, Ph.D.
Professor
University of South Florida
Tampa, Florida   33620

.i, Technical Information Division

RESEARCH ACCOMPLISHMENTS

UNDER GRANT 80-0164

RESEARCH ACCOMPLISHMENTS

During the past year, we have worked on several research projects in the areas of reliability, stochastic systems, environmental models, life and social sciences, among others. In structuring the various statistical models in these areas, our aim was to clearly identify the problem under investigation, formulate the problem in such a manner so as to be mathematically complete, illustrate the usefulness of our findings with real data when available or depend on numerical simulation and interpret the final results.

A list of research papers that have appeared, have been accepted, or have been submitted for publication to various professional journals are given below.

RESULTS

1. Bayesian Estimation in the Markov-Gompertz Distribution, METRON , pp. 20-43, 1982.

2. Sensitivity of Loss Functions Used to Obtain Bayes Estimates of Survival, STATISTICA, 1982.

3. A Kinetic Study of Chemotherapy, Journal of Applied Mathematics and Computation, vol. 12, no. 2 & 3, pp. 255-300.

4. A Kinetic Study of Cell Radiosensitivity, International Journal of Bio-Medical Computing, vol. 13, pp. 127-152.

5. Bandwith Selection Procedures For Kernel Density Estimates, Journal of Communication in Statistics, vol. 11, pp. 186-205.

6. Pharmacokinetic Systems Analysis: Some New Formulations, Proceedings of International Conference on Nonlinear Phenomena in Mathematical Sciences, pp. 171-178, Academic Press.

7. Variable Bandwith Kernel Estimates of a Probability Density Function. Technical Report.

8. Detection of Miocardial Infraction: A Nonporametric Approach, Technical Report.

9. Simulation of a Nonlinear Stochastic Ecology Model, Applied Mathematics and Computation, vol. 7, pp. 9-25.

10. Developments in Nonparametric Density Estimation, International Statistical Review, vol. 48, pp. 267-287.

11. On Estimation of a Probability Density Function, Annals of the Institute of Stat. Math, vol. 33, no. 2A, pp. 233-246.

12. On the Validity of the Mantel X^2 Extension and other X^2 Tests. Technical Report.

13. On the Probability Distribution For Mean Residual Life Functions. Technical Report.

14. Parameter Estimates For Linear Decreasing Mean Residual Life Functions. Technical Report.

15. Estimating the Maximum Life Expectancy For Linear Decreasing Mean Residual Life Failure Models. Technical Report.

OTHER PROFESSIONAL ACTIVITIES

1. Elected as Associate managing Editor for a Proceedings Monograph, and **Advanced Textbook** Series, Society of Industrial and Applied Mathematics, **SIAM**--Studies in Applied Mathematics.

2. Elected by the Society of Industrial and Applied Mathematics to serve as a visiting lecturer to academic and scientific institution.

3. Served on the editorial board for the Journal of Applied Mathematics and Computation--AMC.

4. Served on the editorial board of the International Journal of Integral Equations--JIE.

5. Served on the editorial board on the International Journal of Nonlinear Analysis, Theory, Methods and Applications.

6. Served as an external doctoral thesis evaluator for the Indian Institue of Technology of Kampur, India and Indian Institute of Technology of Madras, India.

7. Elected to the International Statistical Institute.

8. Have given about 15 one-hour lectures to students and faculty at the College of Medicine at U.S.F. in statistical methodology in medical sciences.

9. Served as co-editor on Nonlinear Mathematics, Theory Methods and Applications, Pergamom Press, Oxford, New York and Frankfort.

10. Elected to direct and organize the Stochastic Systems, participation of World Congress of Applied Mathematics and Computers, Montreal, Canada, August 1982.

11. Referred research manuscripts for several professional journals in mathematical sciences.

12. Reviewed articles for Mathematical Reviews.

13. Elected to the International Journal on Reliability and Safety.

14. Elected to the International Journal on Stochastic Analysis.

Significant time was spent in evaluating manuscripts of research papers that were submitted in the above journals consistant with my editorial and professional responsibilities.

PAPERS THAT HAVE BEEN PRESENTED AT

ACADEMIC INSTITUTIONS, NATIONAL AND REGIONAL MEETINGS

OF SCIENTIFIC SOCIETIES

* 1. Annual Meeting of the Institute of Management Sciences-- TIMS,
      "A Heuristic Method in Estimating Time Series Forecasting
      Models," May 5, 1981, Toronto, Canada.

* 2. Univeristy of Texas at Arlington, Department of Mathematics,
      (a) "A Procedural Approach to Nonparametric Density Estimation,"
      and (b) "Recent Development in Bayesian Reliability Analysis,"
      February 10, 1981.

* 3. Rice Univeristy, Department of Mathematical Sciences and Jones
      School of Business, "An Analytical Forecasting Model for Business
      Revenue," February 9, 1981.

* 4. Fifteenth Annual Department of Defense Cost Analysis Symposium,
      "Application of Time-Series Forecasting to Contractor Performance
      Analysis," Arlington, VA, October 26-27, 1980, with R. J. D'Accardi.

  5. Joint Meeting, 140th Meeting of ASA and The Biometric Society, ENAR
      and WNAR, "A Quasi-Bayes Estimate for a Reliability Growth Model,"
      August 11, 1980, Houston, Texas, with J. Higgins.

* 6. International Conference on Nonlinear Phenomena in Mathematical Sciences,
      "Statistical Formulation on Some Problems in Pharmacokinetics,"
      June 18, 1980, Arlington, Texas.

* 7. Society of Industrial and Applied Mathematics, "On Nonparametric
      Density Estimation," Birmingham, Alabama, March 20-22, 1980.

* 8. Assistant Secretary of Defense of the United States, Workshop,
      "Acquisition Cost/Price Analysis," Washington, D.C., October 19,
      1980.

* 9. M. D. Anderson Hospital and Tumor Institute, "A Comprehensive Analysis
      of the Data on Passive Smoking and Lung Cancer Presented by Hirayama,"
      Houston, Texas, September 9, 1981.

* 10. Meeting of American Statistical Association, Houston Chapter "Non-
      linear Stochastic Processes," Houston, Texas, September 8, 1981.

   *   Invited talks